

IN THE CLAIMS

The following listing of the claims is provided in accordance with 37 C.F.R. §1.121.

1. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest using at least one imaging device;

acquiring a set of motion data for two or more types of organs from at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data, and wherein the two or more types of organs each perform different physiological functions;

processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors; and

displaying or storing an image generated from the portion of the set of image data.

2. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest using at least one imaging device;

acquiring a set of motion data for two or more types of organs from at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with

the set of motion data, and wherein the two or more types of organs each perform different physiological functions;

processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

reconstructing the set of image data to generate a set of reconstructed data;

processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors; and

displaying or storing an image generated from the portion of the set of reconstructed data.

3. (previously presented) One or more computer readable storage structures comprising:

a routine for acquiring a set of image data representative of a region of interest using at least one imaging device;

a routine for acquiring a set of motion data for two or more types of organs from at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data, and wherein the two or more types of organs each perform different physiological functions;

a routine for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

4. (previously presented) One or more computer readable storage structures comprising:
- a routine for acquiring a set of image data representative of a region of interest using at least one imaging device;
 - a routine for acquiring a set of motion data for two or more types of organs from at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data, and wherein the two or more types of organs each perform different physiological functions;
 - a routine for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;
 - a routine for reconstructing the set of image data to generate a set of reconstructed data; and
 - a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

5. (previously presented) An imaging system, comprising:
- means for acquiring a set of image data representative of a region of interest;
 - means for acquiring a set of motion data for two or more types of organs from at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the means for acquiring the set of image data, wherein the set of image data is acquired substantially concurrent with the set of motion data, and wherein the two or more types of organs each perform different physiological functions;

means for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

means for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

6. (previously presented) An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for two or more types of organs from at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the means for acquiring the set of image data, wherein the set of image data is acquired substantially concurrent with the set of motion data, and wherein the two or more types of organs each perform different physiological functions;

means for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

means for reconstructing the set of image data to generate a set of reconstructed data; and

means for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

7. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, and to process a portion of the plurality of signals based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry; and

a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more types of organs during imaging to contribute to the set of motion data, wherein the sensor-based motion measurement system is separate from the imager, and wherein the two or more types of organs each perform different physiological functions.

8. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry; and

a sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of two or more types of organs during imaging to contribute to the set of motion data, wherein the sensor-based motion measurement system is separate from the imager, and wherein the two or more types of organs each perform different physiological functions.

9. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest using at least one imaging device;

acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors; and

displaying or storing an image generated from the portion of the set of image data.

10. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest using at least one imaging device;

acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;
reconstructing the set of image data to generate a set of reconstructed data;
processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors; and
displaying or storing an image generated from the portion of the set of reconstructed data.

11. (previously presented) One or more computer readable storage structures comprising:

a routine for acquiring a set of image data representative of a region of interest using at least one imaging device;

a routine for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

12. (previously presented) One or more computer readable storage structures comprising:

a routine for acquiring a set of image data representative of a region of interest using at least one imaging device;

a routine for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the

electrical and non-electrical sensors are separate from the at least one imaging device, wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

13. (previously presented) An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the means for acquiring the set of image data, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

means for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

14. (previously presented) An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest;

means for acquiring a set of motion data for a respiratory organ from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the means for acquiring the set of image data, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

means for reconstructing the set of image data to generate a set of reconstructed data; and

means for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

15. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, and to process a portion of the plurality of signals based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry;

a first sensor-based motion measurement system configured to measure electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data; and

a second sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data;

wherein the first and second sensor-based motion measurement systems are separate from the imager.

16. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry; and

a first sensor-based motion measurement system configured to measure electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data; and

a second sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data; and

wherein the first and second sensor-based motion measurement systems are separate from the imager.

17. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest using at least one imaging device;

acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors for acquiring the cardiac and respiratory motion data are separate from the at least one imaging device, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the sets of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors; and

displaying or storing an image generated from the portion of the set of image data.

18. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest using at least one imaging device;

acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors for acquiring the cardiac and respiratory motion data are separate from the at least one imaging device, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;
reconstructing the set of image data to generate a set of reconstructed data;
processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors; and
displaying or storing an image generated from the portion of the set of reconstructed data.

19. (previously presented) One or more computer readable storage structures comprising:

a routine for acquiring a set of image data representative of a region of interest using at least one imaging device;

a routine for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors for acquiring the cardiac and respiratory motion data are separate from the at least one imaging device, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the sets of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

20. (previously presented) One or more computer readable storage structures comprising:

a routine for acquiring a set of image data representative of a region of interest using at least one imaging device;

a routine for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors for acquiring the cardiac and respiratory motion data are separate from the at least one imaging device, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

21. (previously presented) An imaging system, comprising:
- means for acquiring a set of image data representative of a region of interest;
 - means for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors for acquiring the cardiac and respiratory motion data are separate from the means for acquiring the set of image data, and wherein the set of image data is acquired substantially concurrent with the set of motion data;
 - means for processing the sets of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and
 - means for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

22. (previously presented) An imaging system, comprising:
means for acquiring a set of image data representative of a region of interest;
means for acquiring a set of motion data comprising cardiac motion data acquired by one or more types of non-electrical sensors and respiratory motion data acquired by at least one of one or more types of electrical sensors or one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors for acquiring the cardiac and respiratory motion data are separate from the means for acquiring the set of image data, and wherein the set of image data is acquired substantially concurrent with the set of motion data;
means for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;
means for reconstructing the set of image data to generate a set of reconstructed data; and
means for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

23. (previously presented) An imaging system comprising:
an imager configured to generate a plurality of signals representative of a region of interest;
data acquisition circuitry configured to acquire the plurality of signals;
data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, and to process a portion of the plurality of signals based upon the two or more retrospective gating signals and the one or more motion compensation factors;
system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry;

a sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data;

wherein each of the sensor-based motion measurement systems is separate from the imager.

24. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry; and

a sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical or non-electrical activity indicative of the motion of a respiratory organ during imaging to contribute to the set of motion data;

wherein each of the sensor-based motion measurement systems is separate from the imager.

25. (previously presented) A method for processing image data, comprising the steps of:

acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the imager, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

processing the sets of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors; and

displaying or storing an image generated from the portion of the set of image data.

26. (previously presented) A method for processing image data, comprising the steps of:

- acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;
- acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the imager, and wherein the set of image data is acquired substantially concurrent with the set of motion data;
- processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;
- reconstructing the set of image data to generate a set of reconstructed data;
- processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors; and
- displaying or storing an image generated from the portion of the set of reconstructed data.

27. (previously presented) One or more computer readable storage structures comprising:

- a routine for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;
- a routine for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the imager, and wherein the set of image data is acquired substantially concurrent with the set of motion data;
- a routine for processing the sets of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

a routine for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

28. (previously presented) One or more computer readable storage structures comprising:

a routine for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

a routine for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the imager, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

a routine for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

a routine for reconstructing the set of image data to generate a set of reconstructed data; and

a routine for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

29. (previously presented) An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

means for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the imager, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the sets of motion data to extract two or more retrospective gating points and one or more motion compensation factors; and

means for processing a portion of the set of image data based upon the two or more retrospective gating points and the one or more motion compensation factors.

30. (previously presented) An imaging system, comprising:

means for acquiring a set of image data representative of a region of interest from an imager of one of a MRI system, a PET system, a nuclear imaging system, an X-ray system, a PET-CT system, and an ultrasound system;

means for acquiring a set of motion data for a heart from one or more types of electrical sensors and one or more types of non-electrical sensors, wherein the electrical and non-electrical sensors are separate from the imager, and wherein the set of image data is acquired substantially concurrent with the set of motion data;

means for processing the set of motion data to extract two or more retrospective gating points and one or more motion compensation factors;

means for reconstructing the set of image data to generate a set of reconstructed data; and

means for processing a portion of the set of reconstructed data based upon the two or more retrospective gating points and the one or more motion compensation factors.

31. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest, wherein the imager comprises one of a MRI imager, a PET imager, a nuclear imager, an X-ray imager, a PET-CT imager, and an ultrasound imager;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion

compensation factors, and to process a portion of the plurality of signals based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the plurality of signals from the data processing circuitry;

at least one sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical activity indicative of the motion of the heart during imaging to contribute to the set of motion data;

wherein each of the sensor-based motion measurement systems is separate from the imager.

32. (previously presented) An imaging system comprising:

an imager configured to generate a plurality of signals representative of a region of interest, wherein the imager comprises one of a MRI imager, a PET imager, a nuclear imager, an X-ray imager, a PET-CT imager, and an ultrasound imager;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to receive the plurality of signals, to process a set of motion data to derive two or more retrospective gating points and one or more motion compensation factors, to reconstruct the plurality of signals to generate a set of reconstructed data, and to process a portion of the reconstructed data based upon the two or more retrospective gating signals and the one or more motion compensation factors;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry;

an operator workstation configured to communicate with the system control circuitry and to receive at least the processed portion of the reconstructed data from the data processing circuitry;

at least one sensor-based motion measurement system configured to measure non-electrical activity indicative of the motion of a heart during imaging to contribute to the set of motion data; and

at least one sensor-based motion measurement system configured to measure electrical activity indicative of the motion of the heart during imaging to contribute to the set of motion data;

wherein each of the sensor-based motion measurement systems is separate from the imager.